Work Project presented as part of the requirements for the Award of a Master Degree in Finance from Nova SBE

Financial valuation of IPOLFG's expansion project

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Executive Summary

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The *Portuguese Oncology Institute of Lisbon Francisco Gentil* (IPOLFG) is a public oncology hospital, located in Lisbon, with a leading position in the Portuguese oncology medical services, including outpatient (consultations, day hospital, surgeries, complementary means of diagnosis and therapy) and inpatient services (surgeries and medical internment). It has more than 1800 employees and also develops research activities.

IPOLFG is a corporate public entity, with the Portuguese State being its only equity holder, and it cannot have interest-bearing debt. Moreover, 94% of its revenues comes from the *Central Administration of the Health System* (ACSS), via production and prices stablished on *contract-programs*. In 2017, IPOLFG had €131M in revenues, an EBITDA of - €5.4M and FCF of - €12M.

Given the need for extra capacity and better infrastructures, IPOLFG planned an expansion project that consists in constructing a new building (estimated to start operating in 2022) to concentrate ambulatory medical services (except radiotherapy). The construction, in an available piece of land at IPOLFG's campus, of this building with 6 floors above the ground and 4 below (including parking area) is estimated to require a €40M investment and additional €5M in basic equipment. According to the financing plan, SUCH (a non-profit private organization of public utility) will invest €12M (receiving the right to exploit IPOLFG's parking business), *Jerónimo Martins* will contribute with €3M and pharmaceutical sponsors with €5M, leaving a remaining amount of €25M for the Portuguese State to invest via IPOLFG's statutory capital increase.

The goal of this report is to analyze the financial implications and financial viability of the project, thus giving the relevant financial information necessary for the competent authorities to have an informed decision. Although some non-financial considerations are made, those are admittedly out of the scope of this report.

The project's financial impact for IPOLFG is measured by the NPV, calculated as the difference between the present value (PV) of IPOLFG's estimated FCF with the project and the PV of the FCF without the project. A 4.73% discount rate was considered, corresponding to IPOLFG's estimated unlevered cost of equity. In the DCF model built, the number of standard patients was used as the core driver to estimate impacts on revenues and costs via changes in quantities.

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For the case without the new building, a constant number of standard patients was assumed from 2019 onwards, since IPOLFG is currently operating near full capacity; thus, revenues and costs are forecasted to grow at the inflation rate. Mainly due to IPOLFG's negative EBITDA margin (€141M revenues and €142.2M operating costs in 2021), the negative Operating Cash Flow (OCF) is about - €0.2M per year. Considering CAPEX equal to depreciation from 2020 onwards and dealing with NWC requirements, annual FCF is about - €6.7M, corresponding to a PV for IPOLFG's FCF without the new building of - €141.6M.

For the case of implementing the project, 3 main effects were considered: (i) a 15% increase in the number of standard patients, due to capacity increase; the respective impacts on revenues and costs were obtained using the number of standard patients as driver; (ii) costs savings around €1.3M, reflecting higher efficiency, the end of containers renting and in-house production of some services currently outsourced due to lack of capacity; (iii) a €2M increase in research financing (due to the new building's Research Center) approximately matched with an increase in research expenses. Consequently, due to the new building's shift, revenues are expected to rise 13.3% from €141M in 2021 to €159.8M in 2023, while costs are forecasted to increase 13.5% from €142.2M in 2021 to €161.8M in 2023. From 2024 onwards, quantities are assumed to increase at the annual growth rate of cancer incident cases in Portugal (~1%) and prices at inflation (~2%). In this context, the OCF will deteriorate to - €0.8M. The required €45M growth CAPEX is split 20% in 2019, 40% in 2020 and 40% in 2021. After considering the extra sources of financing, the State should split the €25M equity increase in €8M in 2020 and €17M in 2021. After those initial years characterized by large investments, and a period of 5 years for which it is assumed that the new building does not require maintenance CAPEX, IPOLFG's annual FCF is expected to be about - €8.7M. This leads to a PV for IPOLFG's FCF with the new building of - €198.4M.

Therefore, the project's NPV is - €56.7M, the difference between the PV for each case, while the NPV per standard patient (considering a time-horizon only until 2030) is estimated to be - €550. Thus, the competent authorities are advised to weigh the financial costs of IPOLFG's new building with the social welfare benefits – more patients treated by the National Health Service (NHS), higher quality, reduced waiting lists, among others. Despite the negative NPV, the State may want to approve the project, given the increase in social welfare. It requires the State to invest additional €550 in equity in IPOLFG for each additional patient treated by the NHS at IPOLFG. Ultimately, it is a political decision, that may imply, for instance, spending more money in health and less in education.

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1.1. IPOLFG's overview

IPOLFG is a public oncology hospital, located in Lisbon, with a leading position in Portuguese oncology medical services, both outpatient and inpatient

History Highlights

1923 **The Institute is founded in Lisbon,** with the name *Portuguese Institute for the Study of Cancer*, under the tutelage of the Ministry of Public Instruction. Professor Francisco Gentil, the main mentor of the project, is one of the founders.

1927 First building, in the current location of the Institute. **Start of the activities**. During the following decades, several renovations and expansions with **extra buildings** at the same location take place. **(1)**

1987 The Institute starts being under the **Ministry of Health tutelage**.

2005 The Institute changes its legal status for the current one, corporate public entity, under the name *Portuguese Oncology Institute of Lisbon Francisco Gentil, Corporate Public Entity* (**IPOLFG, EPE**).

(1) The entity being studied (IPOLFG) refers only to the Portuguese Oncology Institute in Lisbon. Separate branches of the Institute were created in Coimbra and Oporto, in 1967 and 1974, respectively.

Geographic Presence

Despite the current existence of 3 public specialized oncology hospitals (Lisbon, Coimbra, Oporto), IPOLFG continues to have a **paramount position in the national territory**. The designated area of intervention (which is not limitative) includes all the regions to the south of Coimbra, as well as Azores and Madeira Islands, corresponding to a **population of ~4M inhabitants**.

IPOLFG's area of intervention. Source: IPOLFG website

Areas of Activity

- **Medical services in the oncology area** is the current main focus of the Institute, including: prevention, diagnosis, treatment, medical care and rehabilitation.

  IPOLFG is the leading oncology hospital in Portugal, being organized in different medical areas:

  - Outpatient / Ambulatory medicine (consultations; day hospital; surgeries; complementary means of diagnosis and therapy, including chemotherapy and radiotherapy).
  - Inpatient medicine (surgeries and medical internment).

- **Research and Education:**

  Oncology research and teaching continue to be part of the Institute's activities, faithful to its origins. Nonetheless, the resources currently allocated to this area are few.

Source: IPOLFG

1.1. IPOLFG's overview

In 2017, IPOLFG's resources allowed to provide medical services to +52k standard patients, yielding negative FCF of - €12M

The key figures of IPOLFG's operations in 2017 illustrate its dimension and the variety of its services

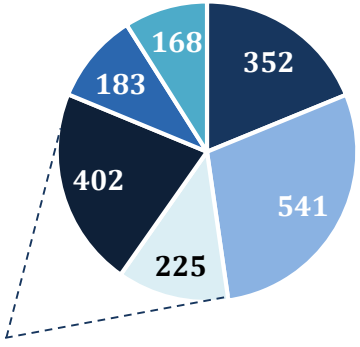
Campus with 60,000 m2

15 buildings

287 beds inpatients

171 beds outpatients

1871 employees



- Doctors
- Nurses
- Technical Assistants
- Operational Assistants
- Technical Personnel for Diagnosis and Therapy
- Others

Number of employees per type.
Source: IPOLFG 2017 Annual Report

Others

- **+ 227k** consultations
- **+ 10k** inpatients treated
- **+ 24k** outpatients DRG*
- **+ 64k** radiotherapy sessions

52,386 Standard Patients: Given the variety and complexity of the services rendered by a hospital, it is commonly used a standardized figure to allow for quantities comparisons. *The details are later explained.*

* DRG: Diagnosis Related Groups

IPOLFG's key financial indicators in 2017 culminate into negative FCF, compensated by the investment of more equity

€131M	**Revenues**	As a public hospital, most of IPOLFG's revenues are determined by the government budget (later developed).
- €0.8M	**EBITDA**	Revenues are not enough to offset cost of sales, personnel costs, supplies and services expenses.
- €5.4M	**Net income**	IPOLFG has been accumulating losses every period, registering negative retained earnings of - €75M in 2017.
€5.7M	**CAPEX**	Both growth CAPEX (later developed) and maintenance investments.
- €12M	**Free Cash Flow (FCF)**	The FCF generated for the period was largely negative. Since cash and cash equivalents remained approximately constant, an equity adjustment through a capital increase of €12M was necessary.

Source: IPOLFG 2017 Annual Report

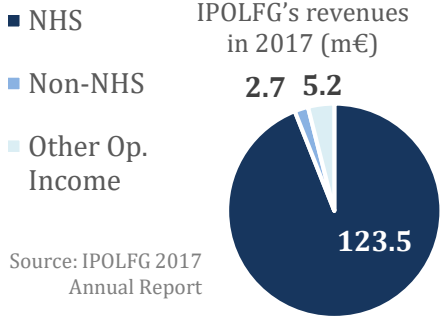
1.1. IPOLFG's overview

The Portuguese State is the only IPOLFG's equity holder and it is also responsible for almost all its revenues, which are defined via ACSS *contract-program*

Sources of Revenues

NHS* revenues:

- Being a public hospital, the services are almost free for the patients (who just have to pay small moderating fees). Thus, 94% of IPOLFG's revenues comes from ACSS.**
- The amount received each year is defined in a **triannual *contract-program***, with **annual addenda**. This amount depends: on the production **quantities** predicted for each service (consultations, surgeries, etc.); on a standard **reference price**; and on the ***case-mix index*** **(CMI)**.
  - The **standard reference price** is the reference for activities grouped and codified into Diagnosis Related Groups (DRG) and has remained stable in the last years (**€2285** since 2015). Specific activities may have an adjustment factor applied to the reference price.
  - The **CMI** reflects the hospital's services level of complexity, being also an adjustment factor applied to the reference price.



Source: IPOLFG 2017 Annual Report

Non-NHS revenues: include healthcare subsystems (e.g.: SAMS; CGD) and moderating fees.

Other operating income: ACSS specific programs; financing for research activities; own sources of income (e.g.: parking fees).

* NHS: National Health Service (*SNS* in Portuguese).

Sources of Financing

- IPOLFG cannot have any interest-bearing debt.
- The main source of debt is accounts payable to suppliers (€50M), followed by advances from customers (€20M).

IPOLFG's Balance Sheet in 2017
Source: IPOLFG 2017 Annual Report

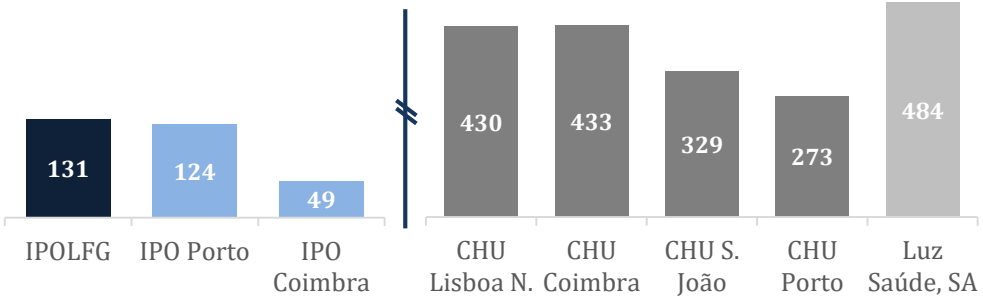
- The Portuguese State is the only equity holder.
- IPOLFG accounts are integrated in the government budget.
- Every time IPOLFG has negative FCF, having not enough sources to face the loss of the period, the State has to invest more capital into IPOLFG.

** ACSS (*Central Administration of the Health System*) is a public institute under the tutelage of the Ministry of Health. The government budget for healthcare in 2017 was €9800M (source: ACSS).

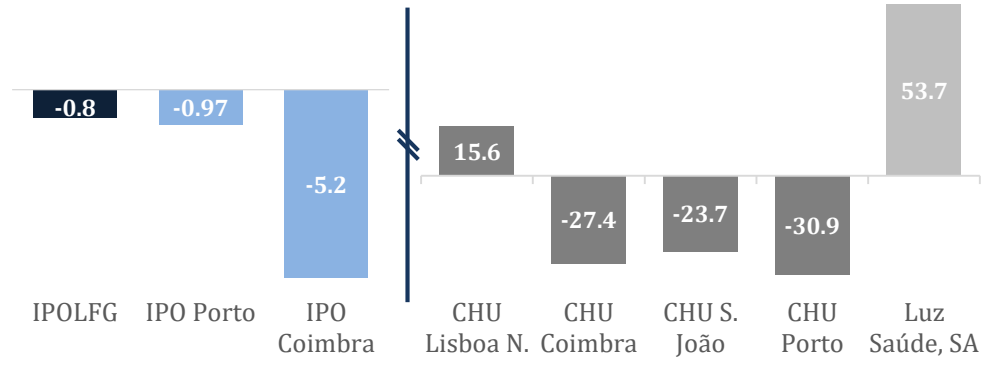
1.2. Benchmarking

IPOLFG's negative EBITDA follows the general tendency of Portuguese public hospitals, reflecting the insufficient income received via ACSS *contract-programs*

Revenues (m€) in 2017



EBITDA (m€) in 2017



- **Public specialized oncology hospitals (besides IPOLFG)**
- **Some examples of non-specialized public hospitals**
- **Non-specialized private hospital (publicly traded)**

Source: *Portal do Benchmark*; Luz Saúde, SA 2017 Annual Report

- IPOLFG, as well as IPO Porto and IPO Coimbra, specializes itself in a particular medical area: oncology.
- Not surprisingly, some non-specialized Portuguese public hospitals have larger annual turnovers. Nonetheless, IPOLFG and IPO Porto have considerable dimensions.
- Luz Saúde, SA, a private hospital, is the only publicly traded Portuguese hospital and has a larger turnover.

- The 3 **oncology hospitals** have all **negative EBITDA**, with IPOLFG having the best performance.
- Negative EBITDA is **also common among non-specialized Portuguese public hospitals**, being CHU Lisboa Norte an exception (3.5% EBITDA margin).
- On the other hand, Luz Saúde, SA shows a satisfactory 11% EBITDA margin.
- While private hospitals aim to maximize their profits and set their own prices, **public hospitals** receive money via ACSS *contract-programs* with the **goal of covering their expenses** (which is not achieved in most cases).

1.3. Project's overview

The construction of a new building for outpatient medicine is required, since current infrastructures are no longer able to respond to capacity and quality needs

Current situation of IPOLFG's infrastructures

Need for more capacity (outpatient medicine)

- Given the increasing demand for IPOLFG's medical services, it has adopted ***ad hoc* solutions**, with adaptations, small expansions and temporary buildings.
- The **current necessity** for extra capacity for the ambulatory area **can no longer be satisfied with the existent resources** nor with minor adjustments.

Temporary buildings

- **One of the buildings** currently used by IPOLFG belongs to the Ministry of Finance and **should be released**.
- There are **containers** holding part of the hospital services (namely chemotherapy). These temporary solutions must come to an end, given **the lack of sustainability and quality** that they imply.

Outpatient medical services spread over different buildings

- This dispersion implies the **inefficient use of human and technical resources**.
- Patients may have to move from one building to the other, sometimes with adverse weather conditions. In more critical situations, IPOLFG needs to use **ambulances to transport those patients**, supporting the inherent costs.

Problems identified since the 90s but not yet solved

- **In several occasions, a construction of a new building was plan** to solve the mentioned problems (e.g.: tender process in 1993; architectural project in 2001; announcement, in 2009, of plans for a new building in Chelas).
- However, **projects were always delayed and never went through**.

Project for the construction of a large new building

- **Outpatient medicine**: the new building will concentrate almost all the outpatient medical area (with the exception of radiotherapy), currently spread over different buildings. It includes:
  - **Medical consultations**
  - **Day hospital**
  - **Outpatients DRG** (namely ambulatory surgeries and complementary means of diagnosis and therapy)
- **Research**: the new building will have a Research Center with ~2000 m2, since current research infrastructures are insufficient (~450 m2).

Source: IPOLFG

1.3. Project's overview

The new building, requiring a total investment of €45M, will allow to increase outpatient capacity (+15%), efficiency, quality and to reorganize infrastructures

Project details

- **Location**: available piece of land in IPOLFG's campus, next to *Praça de Espanha*.
- **Building features**:
  - Deployment area: ~6k m2
  - Above ground: ~24k m2 of gross building area; 5 floors for outpatient medicine and 1 for research
  - Below ground: ~24k m2 of gross building area; 4 floors for technical areas and parking
- **Timing**: after the project and the financing plan approval and the public procurement of the work, the construction takes about 2 years. For the analyses conducted, the building is assumed to be constructed in 2020 and 2021 and start operating in 2022.

Project investment estimated by IPOLFG: €45M

- **Building (€40M)**: it comprises the 6 floors above ground (~€28M) and the 4 floors below ground (~€12M).
  - The 4 floors below ground include the parking area, which will have between 800 and 1000 parking spaces.
- **Basic Equipment (€5M)**: although the existent equipment for outpatient medicine will be used in the new building, some new medical equipment will need to be bought given the capacity increase.

Project goals

- **Capacity increase**: immediate shift of 15% in the capacity for **outpatient medical services** (but with potential to accommodate more than 20% capacity increase). This will allow to:
  - **Reduce** the existent **waiting lists**
  - **Stop sending patients for other hospitals** due to IPOLFG's lack of capacity
  - Receive more patients who currently go to non-specialized hospitals (either public or private)
- **Efficiency and quality gains**:
  - **Modern infrastructures** (substituting containers and other precarious conditions) will increase the services quality, with a **better allocation of human and technical resources.**
  - ***Nearly Zero Energy Building*** **(NZEB)**: considerable energy savings thanks to renewable energies (solar panels); thermal insulation; efficient heating and ventilation systems.
- **Reorganization of current infrastructures**, with the previously explained release of temporary structures, implying savings with containers rents.

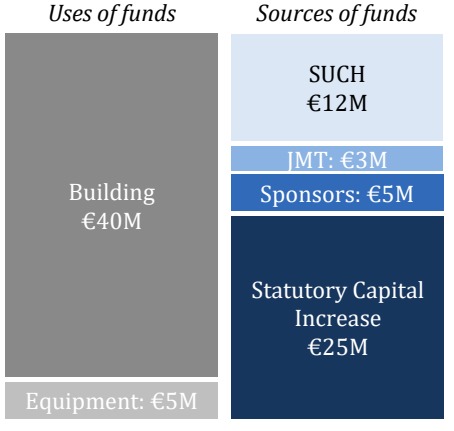
Source: IPOLFG

1.3. Project's overview

The project is going to be partially financed by SUCH (€12M), JMT (€3M) and sponsors (€5M); additional €25M are needed via an increase in statutory capital

Project financing plan

- **SUCH (€12M)**: SUCH (*Serviço de Utilização Comum dos Hospitais*) is a non-profit private organization of public utility that provides services in the health sector. IPOLFG and SUCH already signed a **protocol**:
  - **SUCH commits itself to construct the 4 underground floors** (including technical areas and parking), supporting the inherent investment expenses (estimated in €12M).
  - **SUCH will bear the implied risk**. In particular, if the construction costs more than €12M, SUCH will support that cost.
  - The construction must be completed in 12 to 18 months since the starting date.
  - **SUCH will exploit IPOLFG's parking business**, receiving the inherent revenues. Nonetheless, SUCH commits to pay to IPOLFG the maximum between €200k per year and 10% of the annual gross revenue (*these revenues CFs for IPOLFG have no incremental impact, since they are approximately equal to the ones IPOLFG currently receives, i.e., parking revenues have no effect on the project's valuation*).
- ***Jerónimo Martins* [JMT] (€3M)**: the Portuguese retailing group will construct new headquarters next to IPOLFG's campus. It is foreseen, based on negotiations between IPOLFG, JMT and Lisbon Municipality, that JMT will pay €3M to IPOLFG in order to use part of IPOLFG's parking area. However, no protocol was signed yet.
- **Sponsors (€5M)**: based on negotiations between IPOLFG and pharmaceutical companies with oncology research activities in Portugal, IPOLFG expects they will contribute with €5M for the research center in the new building. Still uncertain.
- **Statutory Capital Increase (€25M)**: the remaining part of the investment needs to be financed by the Portuguese State, IPOLFG's equity holder, since IPOLFG does not have internal funds to finance the project.



Representation, not at scale, of the project's investment and financing amounts.

IPOLFG is requiring to the Portuguese State, via ACSS:

- **The approval of the project**, since the investment amount is larger than 2% of the statutory capital.
- **A statutory capital increase of €25M.**

Consequently, IPOLFG has to present to the Ministry of Health and to the Ministry of Finance a **financial analysis about the viability of the project and the implied results**.

Source: IPOLFG

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2. Methodology

The project's NPV for IPOLFG is going to be calculated as the difference between the expected value with the project and the expected value without the project

Question to be addressed: **What is the net incremental financial impact for IPOLFG of the new building project?**

Methodology:

1. IPOLFG's value without the project

- Carefully analyze IPOLFG current situation and **historical financial statements**: balance sheet, income statement and cash-flows statement.
- Understand the **business model**, different segments and main drivers.
  - The **number of standard patients was the core driver chosen** (later explained)
- Build a **discounted cash-flows (DCF) model** that integrates the 3 Financial Statements and the identified drivers, estimating IPOLFG's future FCF if the identified project was not implemented.
- Estimate **IPOLFG's cost of capital** to use as the FCF discount rate.
- Obtain IPOLFG's expected value without the project as the present value (PV) of future FCF.

2. IPOLFG's value with the project

- Using the financial model built, **incorporate the impacts of the project**, namely:
  - Required **investment**
  - Increased revenues and costs that result from the **increased capacity** (outpatient medicine)
  - **Savings** (costs reduction) that result from higher efficiency and infrastructures reorganization
  - Increased income received for **research activities** and increased costs
- Apply the **Adjusted Present Value (APV) method**, including de additional impact of the financing effects and using different discount rates.
- Obtain IPOLFG's expected value with the project as the sum of the PV of future FCF without the financing effects and the PV of the financing effects.

3. Project's Net Present Value (NPV)

- Calculate the project's NPV as the difference between IPOLFG's value with the project and IPOLFG's value without the project, since it represents the project's net incremental financial impact.

Important Note: The goal of this report is to analyze the financial implications and financial viability of the identified project, as required by IPOLFG to Nova SBE, thus giving the relevant financial information necessary for the competent authorities to have an informed decision. Although some **non-financial considerations** are made (since a public project in the health sector has to be analyzed in the context of the social welfare generated), those **are admittedly out of the scope of this report**. Moreover, the financial analysis is made from IPOLFG's perspective (i.e., the NPV for IPOLFG) and not from the Portuguese State's.

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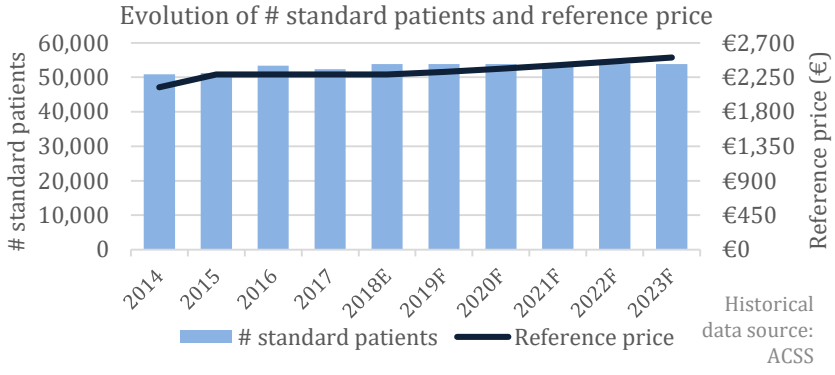
3. IPOLFG's value without the project

The proxy *number of standard patients* is the key driver used to estimate IPOLFG's revenues and costs; it is assumed to remain constant without the new building

Number of standard patients rationale

- IPOLFG, as hospitals in general, provides a **wide variety of services** (medical consultations, nursing consultations, methods of diagnosis, different types of surgeries, radiotherapy, chemotherapy, etc.), each of them with its **own quantities**, **prices** and **different types of costs**.
- Given this **diversity and complexity**, it is unreasonable to analyze and estimate each specific service separately. One **commonly used approximation** (namely by ACSS) is the **number of standard patients**. A standard patient is a fictional figure whose idea is basically to **standardize quantities based on the reference price** stablished on ACSS *contract-programs* for inpatient and outpatient DRG.
- Thus, for a reference price of **€2285**, to provide one service with a price of €2285 (as a typical inpatient surgery) corresponds, in quantity terms, to one standard patient. On the other hand, a consultation with a price of €100 corresponds to 100/2285 = 0.044 standard patients.
- Revenues for each area are obtained multiplying the number of standard patients by the reference price.
- Regarding each type of cost (cost of sales, personnel, miscellaneous), the **cost per standard patient** was calculated using historical data (dividing the total costs by the number of standard patients) and then used to estimate future costs based on quantities evolution.



- **Reference price**: although constant between 2015 and 2018 (€2285), it is **assumed to grow at the inflation rate from 2019 onwards**.
- **Number of standard patients**: expected to close 2018 with levels similar to 2016. **Without the new building, it is assumed to remain constant from 2019 onwards**, since IPOLFG is near full capacity.

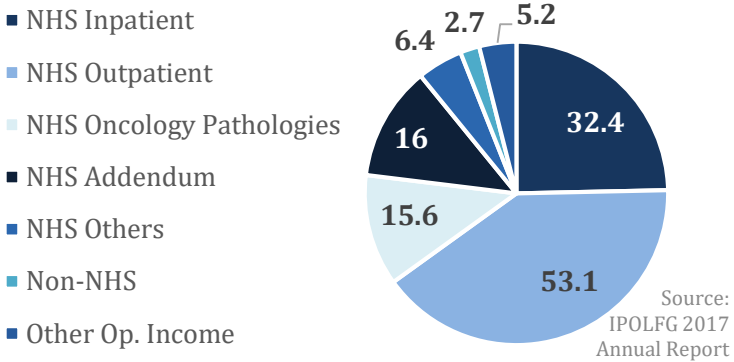
  It is important to mention that, although the number of standard patients decreased 2% in 2017, NHS revenues rose due to an increase of €4.6M in the addendum value (which has the goal of compensate production in excess of the contracted one), which suggests that, in 2016, IPOLFG was not compensated by a significant part of the standard patients (~3.5k).

Sources: ACSS, IMF

3. IPOLFG's value without the project

With €53.1M, outpatient medical services represent 40% of IPOLFG's revenues; analyses will focus on the areas that would be affected by the new building

Breakdown (m€) of revenues in 2017 (€131M)



Source: IPOLFG 2017 Annual Report

- As already stated, 94% of IPOLFG's revenues corresponds to NHS revenues, received via ACSS *contract-program*.
- Inside NHS revenues (€123.5M in 2017), outpatient area (€53.1M) has the largest proportion (43%), including:
  - NHS Consultations (€23.3M)
  - NHS Outpatient DRG (€13.M)
  - NHS Day Hospital (€1.8M)
  - NHS Radiotherapy (€14.2M)
- The new building is directed precisely for the outpatient area, with the exception of radiotherapy, which will continue in a separate building.
- In the next page, a detailed analysis is dedicated to the historical evolution of the areas for which it is required the new building.

Areas not affected by the new building:

Source: IPOLFG

NHS Inpatient

With a significant proportion of NHS revenues (26%), it is far more profitable than the outpatient area (page 26).

Stable in the last years: €33.3M in 2018 vs. €32.5M in 2013.

NHS Radiotherapy (outpatient)

One of the areas that grew the most in the last years. It almost double from 2013 (€7.9M) to 2018 (€15.1M).

Specific investments have been made and it does not require a new building.

NHS Oncology Pathologies

The substantial growth from 2013 (€6.3M) to 2016 (€16.3) has now stop, with predictions of €13.5M for 2018, followed by a stable path.

NHS Others

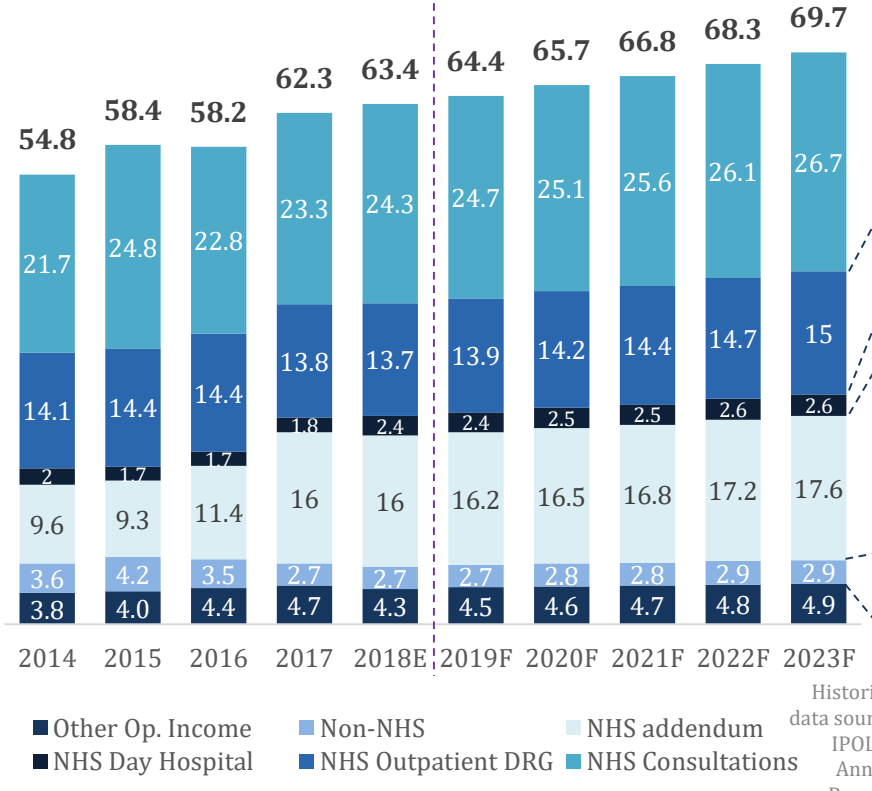
Mainly incentives to achieve same efficiency and quality KPIs. Relatively stable in the last years, with 2017 levels equaling 2014 ones (€6.4M).

As mentioned in the last page, the number of standard patients without the new building was assumed to be constant from 2019 onwards. Although radiotherapy may continue to grow, it is not affected by the new building, so the net incremental impact of that neglection is zero for effects of the project's valuation.

3. IPOLFG's value without the project

After a 3.7% CAGR in the last 5 years, ambulatory NHS (excl. radio), NHS addenda, non-NHS and other op. income are expected to have a 2% CAGR for the next 5 years

Breakdown of the sources of revenues (m€) that would be affected by the project (2014-2023)



Historical data source: IPOLFG Annual Reports

As mentioned on slide 15, without the new building, from 2019 onwards, quantities are assumed to remain constant and prices to rise at the inflation rate.

NHS Consultations: **(i)** Main source of revenue inside ambulatory area; **(ii)** 2018 estimated to close at 2014 levels; **(iii)** Suggests need for extra capacity.

NHS Outpatient DRG: **(i)** Relatively constant since 2014; **(ii)** Potential to increase with extra capacity.

NHS Day Hospital: **(i)** Smaller area, but grew ~50% from 2015 to 2018; **(ii)** Potential to further increase with extra capacity.

NHS Addendum: **(i)** ACSS defines the contracted production via *contract-programs* and remunerates only for that agreed amount, although IPOLFG cannot deny patients; **(ii)** Extra production is usually compensated via *contract-programs* addenda; **(iii)** Addenda values have increased, reflecting the concern to fairly compensate extra production.

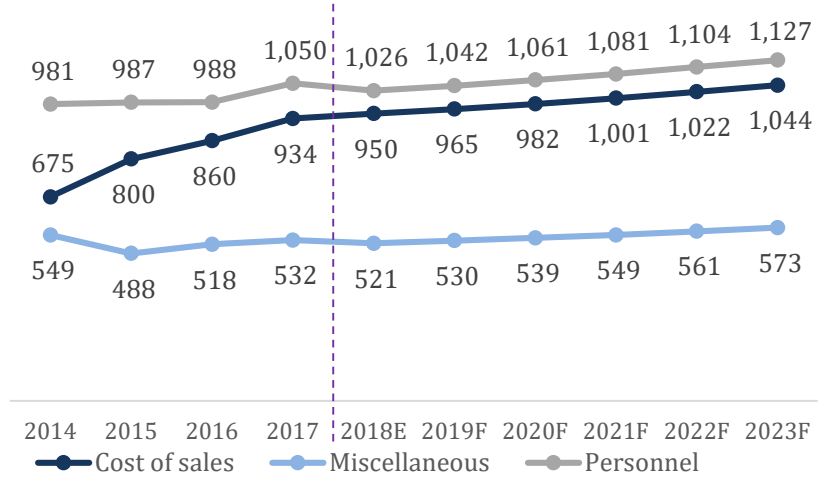
Non-NHS: **(i)** Patients from Azores and Madeira Islands, previously considered as Non-NHS, were integrated in NHS in 2015, explaining the followed declined; **(ii)** Potential to increase with extra capacity.

Other Op. Income: **(i)** smaller financing of research activities in 2018 (€0.86M) compared to 2017 (€1.12M); **(ii)** expected to increase with Research Center in new building.

3. IPOLFG's value without the project

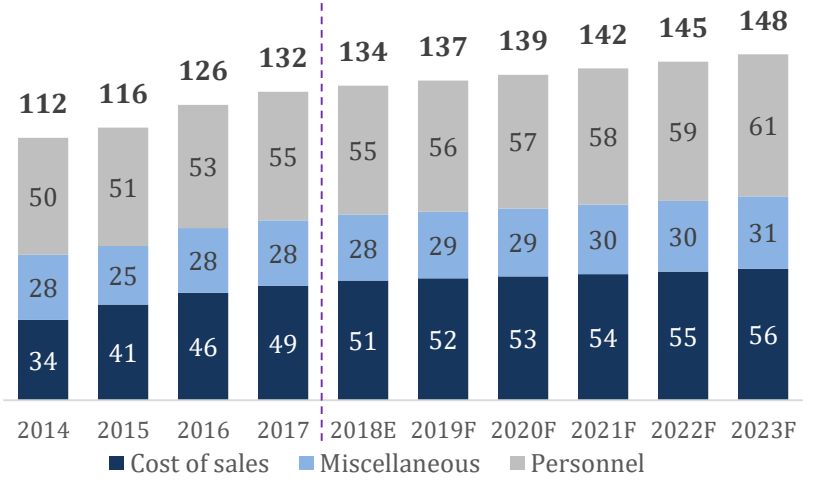
Cost of sales per standard patient was the main driver of a 5.6% CAGR in 2014-17. Given its expected slowdown, it is forecasted a 2% CAGR for the next years

Costs per standard patient (€), 2014-2023



- While personnel and miscellaneous costs per standard patient have been relatively stable, cost of sales per standard patient have been growing substantially due to increased expenses with medicines and pharmaceutical products.
- **Forecasting**: costs per standard patient are assumed to grow at the inflation rate (even for cost of sales, 2018 data already suggests a slowdown of the previous escalation; it is believed the growth will indeed slowdown thanks to generic drugs increased usage).

Costs (m€) breakdown per type, 2014-2023



- Between 2014 and 2017, operating costs (CAGR of 5.4%) grew slightly more than operating revenues (CAGR of 4.9%).
- Personnel costs are the largest ones, but cost of sales have grown the most.
- **Forecasting**: with constant quantities, the growth is explained by higher costs per standard patient (left box).

Historical data source: IPOLFG Annual Reports. Note: while 2018 revenues have a higher precision, given ACSS contract-programs, 2018 costs' estimations may not exactly correspond to end-of-the-year values.

3. IPOLFG's value without the project

Based on negative EBITDA margins and precaution regarding non-recurrent income, OCF is forecasted to be slightly negative, about - €0.2M per year

IPOLFG's summarized OCF without the new building, 2014-2023

Values in million €	2014	2015	2016	2017	2018E	2019F	2020F	2021F	2022F	2023F
Revenues	113.9	116.2	124.3	131.4	133.5	135.9	138.4	141.0	144.0	147.0
Operational Expenses	(112.8)	(117.1)	(126.7)	(132.2)	(135.0)	(137.1)	(139.6)	(142.2)	(145.2)	(148.3)
EBITDA	1.1	(0.9)	(2.3)	(0.8)	(1.5)	(1.2)	(1.2)	(1.2)	(1.3)	(1.3)
Depr. & Amort.	(5.3)	(5.8)	(6.1)	(6.6)	(6.3)	(7.0)	(7.5)	(7.6)	(7.6)	(7.2)
Provisions of the period	(1.8)	(1.4)	(0.7)	(0.1)	(0.4)	(0.4)	(0.4)	(0.4)	(0.4)	(0.4)
EBIT	(5.9)	(8.1)	(9.1)	(7.5)	(8.2)	(8.6)	(9.1)	(9.2)	(9.3)	(8.9)
Financial gains	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Financial losses	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)
EBT recurrent	(5.9)	(8.1)	(9.1)	(7.5)	(8.1)	(8.5)	(9.1)	(9.2)	(9.3)	(8.9)
Non-recurrent income	2.4	5.2	1.0	2.3	1.7	1.8	1.8	1.9	2.0	2.1
% services revenues	*2%*	*5%*	*1%*	*2%*	*1.3%*	*1.3%*	*1.3%*	*1.3%*	*1.3%*	*1.3%*
Non-recurrent expenses	(0.5)	(0.9)	(0.1)	(0.2)	(0.5)	(0.5)	(0.5)	(0.5)	(0.5)	(0.6)
EBT	(4.0)	(3.8)	(8.2)	(5.4)	(6.9)	(7.2)	(7.8)	(7.8)	(7.8)	(7.4)
Corporate income taxes	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)
Net income	(4.0)	(3.9)	(8.2)	(5.4)	(6.9)	(7.3)	(7.8)	(7.8)	(7.8)	(7.4)
OCF	1.2	2.0	(2.2)	1.3	(0.6)	(0.3)	(0.3)	(0.2)	(0.2)	(0.2)

Historical data source: IPOLFG Annual Reports

Note that IPOLFG has no interest-bearing debt, reason why Operating Cash-Flow (OCF) is calculated by summing D&A to net income (and not to EBIT). It was opted to keep the nomenclature used on the company's financial statements, but note that all these CFs result in flow to equity. The CFs mentioned as "financial", besides not being material, do not reflect financing decisions, reason why they were presented inside the OCF.

Revenues and operating expenses summarize the analyses previously done.

IPOLFG's **EBITDA** has been **slightly negative** and is expected to continue to be, reflecting that the **prices stablished on ACSS contract-programs are not enough to cover operational costs.**

IPOLFG **has substantial D&A expenses** due to the high level of fixed assets (mainly **buildings and basic equipment**). Slight increase due to recent additional CAPEX is expected to stop in the scenario without the expansion.

Financial gains and losses are not material.

Non-recurrent income (mainly **subsidies** recognized as income when acquired goods are amortized) may have a relevant impact, since slightly negative results for the period may turn positive thanks to it, as happened in 2014, 2015 and 2017. It was forecasted as a percentage of services rendered (which was assumed to be the average of the last two years).

Having negative EBT, IPOLFG just pays a very small amount of autonomous taxation.

Net income substantial negative results are explained by the slightly negative EBITDA and the considerable D&A expenses.

OCF, obtained by summing D&A to net income, has been **oscillating around zero** and are **forecasted to be slightly negative**.

3. IPOLFG's value without the project

After large fluctuations due to non-recurrent events and accounts payable increase (now stabilized), maintenance CAPEX is expected to justify ICF of - €6.5M

IPOLFG's summarized ICF without the new building, 2014-2023

Values in million €	2014	2015	2016	2017	2018E	2019F	2020F	2021F	2022F	2023F
CAPEX and changes in int.	(5.1)	(5.9)	(6.0)	(5.7)	(10.0)	(9.4)	(7.2)	(7.2)	(7.3)	(7.4)
Inv. in NWC	9.9	(2.1)	10.7	(7.6)	(6.2)	5.3	0.8	0.8	0.9	0.9
NWC level	*(22.6)*	*(20.4)*	*(31.1)*	*(23.6)*	*(17.4)*	*(22.7)*	*(23.4)*	*(24.2)*	*(25.1)*	*(26.1)*
ICF	4.8	(8.0)	4.7	(13.3)	(16.2)	(4.1)	(6.4)	(6.4)	(6.4)	(6.5)

Historical data source: IPOLFG Annual Reports

CAPEX and changes in intangible assets:

- The higher CAPEX level in **2018** is mainly explained by **investments** (growth CAPEX) in the **Bone Marrow Transplant Unit** and in the **Immunohemotherapy Service**, being reflected in increased Balance Sheet values for "Buildings" and "Basic Equipment".
- **2019** is also expected to register high values due to:
  - Projects in progress (namely with Portugal 2020) to acquire **IT equipment**
  - The obligation of paying **€1.5M relative to projects/plans already developed for the new building** (intangible asset). It must be included in the scenario with no new building, being a **sunk cost**, since the payment is independent from the new building being constructed
- Besides the aforementioned cases, CAPEX values reflect mainly maintenance CAPEX. Thus, without the new building expansion, **CAPEX is assumed to be equal to D&A expenses from 2020 onwards**.

Investment in Net Working Capital (NWC):

- IPOLFG has **negative NWC**, since current liabilities are higher than current assets.
- In fact, **accounts payable to suppliers** represent an important way of financing the operations and have been **increasing tremendously** (€63M in 2017 vs. €27M in 2013), explaining the positive CFs in 2014 and 2016. Further increases are not sustainable and 2018 values are expected to close in line with 2017. This situation reflects the insufficient sources that IPOLFG receives from the government.
- **2017** negative CF of - €7.6M is mainly explained by the fact that there was a **statutory capital increase of ~€12M** in 2017, but **just subscribed in 2018**, implying the recognition of that amount as other accounts receivable (current asset) in 2017.
- **2018** negative CF of - €6.2M is mainly explained by the fact that, due to **changes in the accounting methods used**, €10M considered as deferred revenues (current liability) in 2017 moved to "subsidies" (equity) in 2018.
- **From 2020 onwards**, with the stabilization of NWC levels, the **investment in NWC will be close to zero**.

3. IPOLFG's value without the project

Without the implementation of the new building project, the present value of IPOLFG's future FCF is expected to be - €141.6M

IPOLFG's FCF without the new building, 2014-2023

Values in million €	2014	2015	2016	2017	2018E	2019F	2020F	2021F	2022F	2023F
OCF	1.2	2.0	(2.2)	1.3	(0.6)	(0.3)	(0.3)	(0.2)	(0.2)	(0.2)
ICF	4.8	(8.0)	4.7	(13.3)	(16.2)	(4.1)	(6.4)	(6.4)	(6.4)	(6.5)
FCF = OCF + ICF	6.0	(6.1)	2.5	(12.0)	(16.9)	(4.4)	(6.7)	(6.7)	(6.6)	(6.7)
Adjust. in Equity	0.5	4.3	(2.6)	12.0	13.5	2.8	6.7	6.7	6.6	6.7
Changes in cash	6.6	(1.8)	(0.1)	(0.0)	(3.4)	(1.5)	-	-	-	-

Historical data source: IPOLFG Annual Reports

Free Cash-Flow (FCF):

- The positive FCF in 2014 and 2016 is mainly a consequence of the abnormally positive CFs from disinvestment in NWC that led to positive ICF (as previously explained). On the opposite side, the large negative values in 2017 and 2018 are also a consequence of the explained non-recurrent phenomena with ICF.
- IPOLFG's FCF tends to be negative, but with values not as large as in 2017/18. It is predicted that the **FCF will be about - €6.7M, from 2020 onwards, in the scenario with no new building**.

Adjustments in equity:

- Being fully financed with equity, IPOLFG's **negative FCF has to be compensated by the investment of more equity** into the company (when existent cash is not enough).
- In fact, there were **statutory capital increases** of €5M in 2015 and €12M in 2017.
- According to the projections, due to annual negative FCF, the **Portuguese State will have to invest**, on average, **€6.7M of equity in IPOLFG every year** (in the scenario without the new building). This shows that IPOLFG's business is not self-sustainable.
- In alternative to invest money in IPOLFG via equity increases, the Portuguese Government could increase the NHS revenues stablished in ACSS *contract-programs*.

- *Starting in 2019 and considering a perpetuity value from 2031 onwards, all the estimated future FCF of IPOLFG without the new building were discounted to the present moment (i.e., January 2019th), using as **discount rate IPOLFG's estimated cost of equity of 4.73%** (see page 30).*
- *Thus, **a negative present value (PV) of - €141.6M** was obtained, corresponding to the "firm's financial value" without the project. This means that, without the new building, the State would need to invest €141.6M in IPOLFG, in PV terms, to finance its operations.*

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4. IPOLFG's value with the project

The number of standard patients is expected to rapidly increase 15% as a result of the increased capacity, which will reduce waiting lists and cause a substitution effect

Rationale for the expected impact of the new building on IPOLFG's outpatient segment

+15% capacity increase

New building: immediate capacity increase of +15% (but with potential for more than 20%) for the outpatient segment, excluding radiotherapy.

Waiting lists

IPOLFG has substantial waiting lists, with high average waiting time (AWT): in **2017**, there were **7421 new patients entering IPOLFG's Surgery Waiting List** (+19% than in 2016) and the **AWT was 109 days**.* With the extra capacity, people currently waiting will be converted into patients, increasing the number of patients.

"Substitution Effect"

Patients currently treated in the oncology department of **non-specialized hospitals** are expected to move to IPOLFG, once there is capacity available ("substitution effect" reflecting trend for hospitals specialization). This includes a "substitution effect" between **private** and public **hospitals**, for which waiting lines (that will decrease in IPOLFG with the new building) and services quality (that will increase in IPOLFG) are important factors (*Dardanoni, et. al., 2018*).

(1)

15% increase in # standard patients

It is believed that the 15% capacity increase for outpatient medicine will approximately correspond to a 15% increase in the quantity of outpatient medical services rendered (measured in number of standard patients).

15% increase in # standard patients **remunerated**

Since extra production has been compensated by ACSS via *contract-program* addenda, it is believed that ACSS will remunerate the additional production.

- The impact on revenues is obtained by multiplying the new number of standard patients by ACSS reference price (which does not change relatively to the one in the scenario without the new building) – page 24.
- The impact on costs is obtained by multiplying the new number of standard patients by the costs per standard patient – page 26.
  - Additional cost savings and impacts of the change in the outpatient/inpatient ratio are considered – pages 25 and 26.

(1)

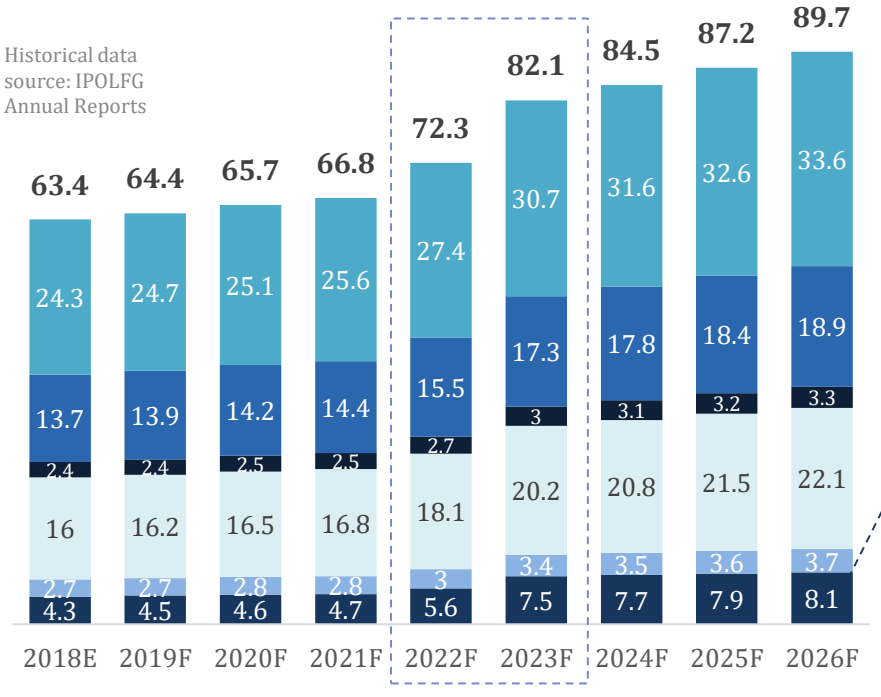
- Given the lack of strong support (both empirical and from literature review) for the fact that the increase in the number of standard patients will match capacity increase, a sensitivity analysis was conducted (later presented).

* Sources: IPOLFG 2017 Annual Report and Ministry of Health (NHS average waiting time)

4. IPOLFG's value with the project

Revenues from the areas affected by the new building are expected to grow 22%* from 2021 to 2023, mainly due to the capacity shift, and 3% per year thereafter

Breakdown of the sources of revenues (m€) that are affected by the project (2018-2026)



- **The new building is expected to start operating in the beginning of 2022.**
- The 15% increase in the **number of standard patients** is assumed to be progressive over two years: **5% increase in 2022** and the **remaining in 2023**.
- **From 2024 onwards**, the number of standard patients is assumed to rise at the annual **growth rate of cancer incident cases in Portugal** (**~1%**; source: IARC).
- Moreover, revenues are also positively affected by inflation (as it was the case without the new building).
- Thus, there is a positive shift in 2022 and especially in 2023 for all sources of revenues, followed by a constant growth of ~3% from 2024 onwards (2.1% inflation, 1% cancer incidence).
- A particular case is the one of other operating income, which includes **financing for research activities**.
- With the large increase in the resources allocated to research (new Research Center with 2000 m2 versus the current 450 m2), IPOLFG predicts that financing will rise from ~€1M to €3M (again, it is assumed a progressive increase in 2022 and 2023).

** Overall revenues (including areas not affected by the project), presented in page 27, only grow 13.3% from 2021 to 2023, and not 22%.*

4. IPOLFG's value with the project

In 2022, costs savings around €1.3M are expected, mainly due to the end of containers' rents, fewer maintenance expenses and reduction in outsourced services

Miscellaneous Costs	2018 Budget (k €)	Savings (%) w/ new building	Savings (k €) w/ new building	Rationale
Rents	210	100%	**210**	Stop renting containers
Maintenance	3237	15%	**486**	Less need for repair (new equipment); More efficient maintenance (single building)
Outsourced CDT*	824	90%	**742**	Currently, some patients are sent to other hospitals due to lack of capacity and implied costs are supported. With the increase in the installed capacity, this production will be in house
Outsourced surgeries	18	90%	**16**	
Electricity	1544	10%	**154**	Nearly zero energy building (NZEB), with renewable energy (solar panels), will imply higher energy efficiency and savings
Gas, heating, others	587	5%	**29**	
Fuels	20	50%	**10**	Transportation costs with patients from one building to the other will fall thanks to a single building
Cleaning and comfort	1653	Increase 15%	**Increase 248**	Increased area will imply higher fixed costs
Surveillance and security	423	Increase 15%	**Increase 63**	
TOTAL	**8516**	**16%**	**1335**	Sum of all the previous savings/increases

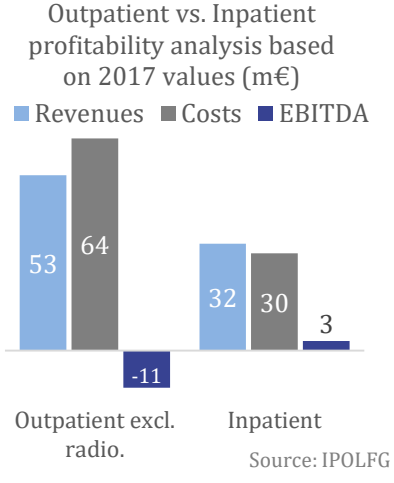
These costs were the ones requiring a separated analysis, given specific savings or fixed costs increase with the new building. All the other costs are calculated by multiplying the cost per standard patient by the new number of standard patients, as presented in the next page (i.e., the impact is fully captured by the variation in the driver used, the number of standard patients).

* CDT: Complementary Diagnosis Techniques

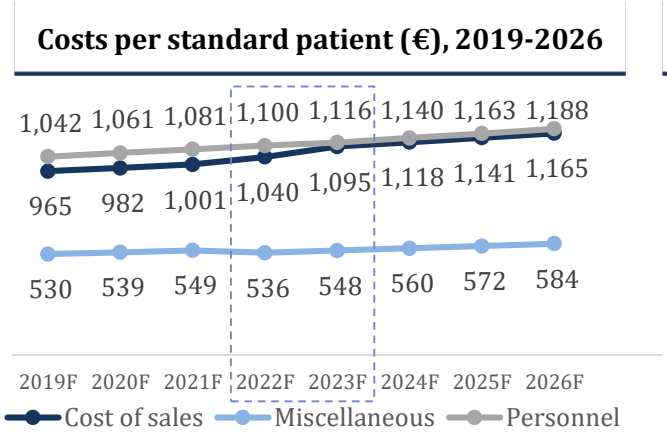
Source: IPOLFG

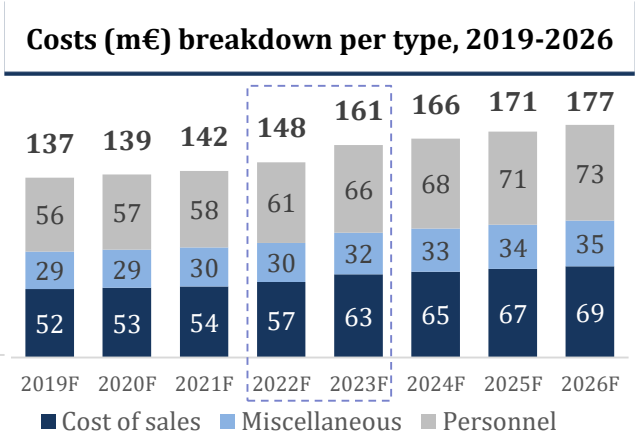
4. IPOLFG's value with the project

Despite the mentioned savings, costs will grow 13.5% from 2021 to 2023, due to higher quantities and outpatient high cost of sales, and 3% per year thereafter



Source: IPOLFG





- Proportionally, outpatient medical services (excluding radiotherapy) have higher costs than inpatient medicine (namely cost of sales).
- Consequently, upon the increase of the outpatient segment with the new building, the necessary adjustments to the overall costs per standard patient (for each type) were done.

- Since **outpatient medical services** have **much higher cost of sales per standard patient** than inpatient medical services, when outpatient weight on IPOLFG's overall services increase, **cost of sales per standard patient have a considerable shift**, achieving €1040 in 2022 and €1095 in 2023. Then, it continues to rise at the inflation rate.
- For miscellaneous and personnel costs, this adjustment is meaningless, because outpatient and inpatient have approximately the same costs per standard patient. They also rise at the inflation rate.

- **In 2022, miscellaneous costs increase is offset by the €1.3M savings** presented in the previous page.
- In 2022 and 2023, there is also an extra increase in **Research and Education personnel costs**, in line with the previous analyzed increase in financing for research activities.
- Overall, given the larger quantities, **the increase in costs is very substantial** (€161M in 2023 vs. €142M in 2021).

Source: IPOLFG

4. IPOLFG's value with the project

After 2022, when OCF is positive (€0.5M) due to that year's cost savings, quantities increase will amplify IPOLFG's negative EBITDA, leading to OCF around - €0.8M

IPOLFG's summarized OCF with the new building, 2019-2028

Values in m€	2019F	2020F	2021F	2022F	2023F	2024F	2025F	2026F	2027F	2028F
Revenues	135.9	138.4	141.0	148.1	159.8	164.8	169.9	175.0	180.3	185.7
Operational Expenses	(137.1)	(139.6)	(142.2)	(148.8)	(161.8)	(166.8)	(172.0)	(177.2)	(182.6)	(188.1)
EBITDA	(1.2)	(1.2)	(1.2)	(0.6)	(2.0)	(2.1)	(2.1)	(2.2)	(2.3)	(2.4)
Depr. & Amort.	(7.0)	(7.7)	(8.1)	(9.5)	(9.0)	(9.1)	(9.1)	(9.2)	(9.3)	(9.4)
Provisions of the period	(0.4)	(0.4)	(0.4)	(0.4)	(0.4)	(0.4)	(0.4)	(0.4)	(0.4)	(0.4)
EBIT	(8.6)	(9.3)	(9.7)	(10.5)	(11.4)	(11.6)	(11.7)	(11.9)	(12.0)	(12.2)
Financial gains	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1
Financial losses	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)
EBT recurrent	(8.5)	(9.3)	(9.7)	(10.4)	(11.4)	(11.5)	(11.7)	(11.8)	(12.0)	(12.2)
Non-recurrent income	1.8	1.8	1.9	2.0	2.2	2.3	2.5	2.6	2.7	2.9
% services revenues	*1.3%*	*1.3%*	*1.3%*	*1.3%*	*1.3%*	*1.3%*	*1.3%*	*1.3%*	*1.3%*	*1.3%*
Non-recurrent expenses	(0.5)	(0.5)	(0.5)	(0.5)	(0.6)	(0.6)	(0.7)	(0.7)	(0.7)	(0.8)
EBT	(7.2)	(7.9)	(8.3)	(9.0)	(9.8)	(9.8)	(9.9)	(10.0)	(10.0)	(10.1)
Corporate income taxes	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)
Net income	(7.3)	(8.0)	(8.3)	(9.0)	(9.8)	(9.9)	(9.9)	(10.0)	(10.0)	(10.1)
OCF	(0.3)	(0.3)	(0.2)	0.5	(0.8)	(0.8)	(0.8)	(0.8)	(0.8)	(0.7)

With the new building, IPOLFG is expected to have **negative OCF about - €0.8M, which represents a €0.5M decrease compared to the forecasted OCF without the new building**. (*In 2022, OCF was exceptionally positive thanks to the analyzed costs savings. However, the further increase in quantities will more than offset the "fixed" savings that take place in 2022.*)

This means that, even excluding the investments required, the **increased scale results in slightly worse operational cash generation**.

- Revenues and operating expenses summarize both the areas affected and not affected by the project.
- **In 2022, EBITDA improves to - €0.6M**, because the specific **costs savings** partially offset the increase in costs caused by larger quantities, i.e., revenues increase in 2022 is larger than costs'.
- The **10% increase in the number of standard patients** in the outpatient segment (excluding radiotherapy) that takes place in **2023** (totalizing the 15% shift) results in a **worse EBITDA** (- €2M). It is not surprising that costs have risen more than revenues, knowing that IPOLFG has negative profitability and that the increased segment (outpatient) is the least profitable one (compared with inpatient).
- **D&A expenses** have an overall increase due to the **new building and equipment** being depreciated.
  - The decrease in 2023 results from the end of the amortization of the €1.5M intangible asset relative to projects/plans developed for the new building
- **Non-recurrent income** is assumed to have a value corresponding to **1.3% of revenues**, in line with historical amounts.

4. IPOLFG's value with the project

With the implementation of the new building project, the present value of IPOLFG's future FCF is expected to go from - €141.6M to - €198.4M

IPOLFG's summarized FCF with the new building, 2019-2028

Values in m€	2019F	2020F	2021F	2022F	2023F	2024F	2025F	2026F	2027F	2028F
OCF	(0.3)	(0.3)	(0.2)	0.5	(0.8)	(0.8)	(0.8)	(0.8)	(0.8)	(0.7)
CAPEX and changes in int.	(17.4)	(23.2)	(28.2)	(8.4)	(8.5)	(8.5)	(8.6)	(8.7)	(9.5)	(9.6)
Inv. in NWC	5.4	1.0	1.2	1.6	4.4	1.5	1.6	1.6	1.6	1.7
NWC level	*(22.8)*	*(23.8)*	*(25.0)*	*(26.6)*	*(31.0)*	*(32.5)*	*(34.1)*	*(35.7)*	*(37.3)*	*(39.0)*
ICF	(12.0)	(22.2)	(27.1)	(6.8)	(4.0)	(7.0)	(7.0)	(7.1)	(7.9)	(7.9)
FCF without financing effects	(12.3)	(22.4)	(27.3)	(6.3)	(4.8)	(7.8)	(7.8)	(7.8)	(8.7)	(8.7)
SUCH	**8.0**	**4.0**								
JMT		**1.5**	**1.5**							
Sponsors		**2.5**	**2.5**							
FCF w/ financing effects	(4.3)	(14.4)	(23.3)	(6.3)	(4.8)	(7.8)	(7.8)	(7.8)	(8.7)	(8.7)
Adj. in Equity	2.7	14.4	23.3	6.3	4.8	7.8	7.8	7.8	8.7	8.7
Statutory capital increase (project)	-	**8.0**	**17.0**	-	-	-	-	-	-	-
Extra adj. in Equity	2.7	6.4	6.3	6.3	4.8	7.8	7.8	7.8	8.7	8.7
Changes in cash	(1.5)	-	-	-	-	-	-	-	-	-

- The **€40M investment in the new building** is assumed to be split in: **€8M** in the end of **2019** (start of constructions); **€16M** in **2020** (60% done); **€16M** in **2021** (100% done). The **€5M** investment in **new basic equipment** is assumed to be done in the end of **2021**.
- **Until 2026**, it is considered that **virtually zero maintenance CAPEX** is required for the new building, in line with public works warranty period (5 years).* **From 2027 onwards**, **maintenance CAPEX** for the new building is assumed to **match depreciation**.
- Given IPOLFG's negative NWC, the growth registered each period will lead to slightly **positive investment in NWC CFs** (higher in 2023 due to larger scale shift).
- According to the **financing plan** presented on page 11, IPOLFG will receive €12M from SUCH, €3M from JMT and €5M form sponsors, assumed to be split as now shown on the left table (SUCH invests earlier, since underground floors are the first being constructed).
- To match the timing of the investments, the State should split the €25M statutory capital increase in €8M in 2020 and €17M in 2021.

The State not only will have to invest the €25M required for the project's investment, as it will also have to invest extra capital to offset the negative FCF each period: from 2020 to 2022, the amount required is approximately the same than the one without the new building, but, in steady-state, the State has to invest €8.7M per year, instead of €6.7M.

* Source: APCMC

*Discounting all the estimated future FCF of IPOLFG with the new building to the present moment, using as discount rate IPOLFG's estimated cost of equity of 4.73% (see page 30), a **negative PV of - €198.4M** was obtained, corresponding to the "firm's financial value" with the project. This means that, with the new building, the State would need to invest €198.4M in IPOLFG, in PV terms, to finance its operations.*

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5. Discount rates

IPOLFG's estimated unlevered cost of equity of 4.73% was used to discount unlevered CFs, while each financing CF was discounted at a specific rate

Discount rate for FCF (excl. side financing): IPOLFG's estimated 4.73% cost of equity

IPOLFG has no interest-bearing debt, so its cost of capital is equal to its unlevered cost of equity, which should reflect the operational risk of the business (measured by the unlevered equity beta).

IPOLFG unlevered cost of equity was estimated using **CAPM**:

- A **"risk-free"[1] rate of 1.69%** was considered, corresponding to 10-year Portuguese Government Bonds[2], in order to include the country risk and approximately match CFs duration.
- An equity market risk premium **(MRP) of 5.5%** was used.[3]
- **IPOLFG's equity beta**, which should correspond to its sector unlevered equity beta, was estimated as the average unlevered beta of 4 European publicly-traded healthcare companies, selected as the best proxies (analysis presented in Att. 2).
  - The obtained value of **0.55**, although showing that the healthcare sector's sensitivity to market fluctuations is little, should still be seen as an upper bound for IPOLFG, since: (i) the oncology business is expected to have slightly less risk than general medical services; (ii) public healthcare services are also expected to fluctuate less than private ones. Despite this limitations, CAPM was still considered a better approach than alternatives (as simply using an hurdle rate for public projects). In fact, the operational risk of the specific business must be taken into account.
- Given the three values mentioned, an **unlevered cost of equity of 4.73% was obtained for IPOLFG** and used to discount all the project's FCFs except the ones referring to the side financing. A sensitivity analysis was conducted, considering the impact of smaller unlevered betas, as presented in Att. 2.

Discount rates for financing CFs

JMT: considered its cost of debt[2] of **0.75%**, since it reflects the risk of JMT not complying with the delivery of the expected amount.

SUCH: considered a **0%** rate: there is a signed protocol defining that the risk is fully supported by SUCH (it will deal directly with the constructors and pay the necessary amount, even if higher than the expected €12M).

Sponsors: considered a **7.68%** rate, obtained by summing a spread of 8% to the 1-year Portuguese Government Bond[2] of -0.32%. The 8% spread reflects an assumed probability of 20% of not contributing the full amount and a 40% loss for that case, thus reflecting the uncertainty relative to sponsors financing.

1. As referred, it has a long-term maturity and includes the country risk; consequently it is not actually a pure risk-free rate.
2. Source: Bloomberg. 3. Source: KPMG 2018 Equity Market Risk Premium – Research Summary.

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6.1. Project's NPV

The project's NPV is - €56.7M considering the perpetuity value. If thinking only until 2030, treating 48k additional standard patients implies a negative NPV of - €26.3M

IPOLFG's summarized project's incremental FCF (2019-2028)

Values in m€	2019F	2020F	2021F	2022F	2023F	2024F	2025F	2026F	2027F	2028F
Revenues	-	-	-	4.2	12.8	14.7	16.7	18.6	20.5	22.6
Operational Expenses	-	-	-	(3.5)	(13.5)	(15.4)	(17.5)	(19.4)	(21.4)	(23.6)
EBITDA	-	-	-	0.7	(0.7)	(0.7)	(0.8)	(0.8)	(0.9)	(1.0)
…										
OCF	-	(0.0)	(0.0)	0.7	(0.6)	(0.6)	(0.6)	(0.7)	(0.7)	(0.7)
ICF	(7.9)	(15.7)	(20.7)	(0.4)	2.4	(0.5)	(0.5)	(0.5)	(1.3)	(1.3)
Financing effects	8.0	8.0	4.0	-	-	-	-	-	-	-
FCF w/ financing effects	0.1	(7.7)	(16.7)	0.3	1.9	(1.1)	(1.1)	(1.2)	(2.0)	(2.0)
Adj. in Equity	(0.1)	7.7	16.7	(0.3)	(1.9)	1.1	1.1	1.2	2.0	2.0
Statutory capital increase (project)	-	8.0	17.0	-	-	-	-	-	-	-
Extra adj. in Equity	(0.1)	(0.3)	(0.3)	(0.3)	(1.9)	1.1	1.1	1.2	2.0	2.0

- The project's incremental CFs are obtained as the difference between the respective CFs with the new building and the CFs without the new building. Thus, the results presented are a summary of all the analyses previously conducted.
- The €45M investment and respective financing are split from 2019 to 2021, resulting in **large negative incremental FCF in 2020/21**.
- In **2022**, **FCF is positive** thanks to **costs savings** related with the new building shift (starting to operate in 2022).
- In **2023**, it is expected the largest increase in quantities (10%, against 5% in 2022). Since IPOLFG's has negative NWC levels, this shift originates large positive CFs relative to **(dis)investment in NWC**, explaining the **positive FCF of €1.9M**.
- From **2027 onwards** (when maintenance CAPEX with the new building is assumed to start), **negative incremental FCF of - €2M** are expected for the project, implying that **the State has to put additional €2M in equity per year**, compared to the scenario without the new building.

IPOLFG's value w/ the project

- €198.4M

- €141.6M

IPOLFG's value w/o the project

Project NPV = - €56.7M

This project does not only imply a €25M investment for the State; it implies an additional investment of €31.7M (via IPOLFG's equity increase), in present value terms

NPV CFs until 2030 **- €26.3M**

NPV CFs 2030 onwards (perpetuity) **- €30.4M**

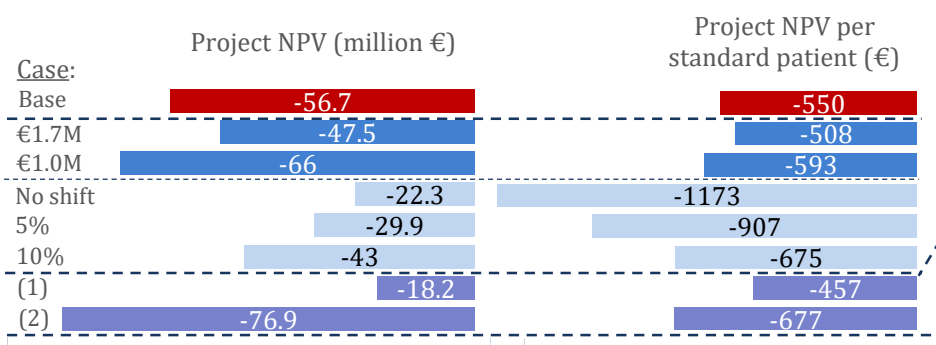
48k *additional standard patients treated until 2030*

NPV per standard patient = - €550

Considering only until 2030, by deciding to invest in this project, the State needs to put €550 in equity in IPOLFG per each one of the 48k additional patients treated

6.2. Sensitivity and scenario analyses

Although always negative, the project's NPV is considerably sensitive to some key drivers: possible scenarios show a range between - €18.2M and - €76.9M



- **Base case**
- **Sensitivity to costs savings**
- **Sensitivity to number of standard patients increase**
- **Scenario Analysis**

Inputs/Drivers for Scenario Analysis	Base Case	Scenario 1	Scenario 2
Cost of sales per st. patient (€)	934	924	942
Misc. costs per st. patient (€)	513	508	518
Personnel costs per st. patient (€)	1,008	998	1,018
Increase in # standard patients	15.0%	10.0%	15.0%
Non-recurrent income as % of revenues	1.3%	2.0%	1.0%
Savings with new building (m€)	1.3	1.7	1.0

Sensitivity to the €1.3M costs savings

Given the uncertainty regarding the magnitude of some savings presented on page 25, an optimistic case of €1.7M savings and a pessimistic one of only €1M savings were considered. Given the perdurability of this **~0.3M shift** in all future years, there is a **material impact of approximately €10M on the project's NPV**.

Sensitivity to the estimated 15% increase in the number of standard patients

It is questionable if production will increase as much as capacity. Besides the base case (15%), smaller increases were considered: 10%; 5%; no shift, growing only at the cancer incidence growth rate, as in the following years. **Since IPOLFG has negative profitability, less quantities actually means less negative NPV**. However, here it is particular important to analyze NPV per patient figures: due to fixed expenses (namely the initial investment), if the number of standard patients is smaller, **the NPV per patient is substantially more negative**.

Scenario analysis

When allowing for small changes in several drivers at the same time (as the ones on the table), **NPV may vary a lot, showing how sensitive some assumptions are**. In the most optimistic case, the project has a NPV of - €18.2M, meaning that, from the initial €25M that the State puts, it still recovers €6.8M, in PV terms.

If ACSS would not increase the contracted revenues in the necessary amount to fully compensate production increase, the NPV would decrease ~€7M for each 1% of production not remunerated (since, for that part, only costs would increase). Although this risk must be taken into account, it is considered unlikely, because: (i) contract-programs addenda had make an effort to match actual quantities produced; (ii) if the State approves the project, it should be implied that extra production needs to be remunerated.

6.3. Final remarks

This report provides the necessary financial information for the competent authorities to weigh the project's financial cost against its benefits and decide

		Further Analyses
Financial results: - €56.7M NPV	– ***The NPV is extremely important for IPOLFG and the State to know how much the project will cost, but this is not a "typical project" where the NPV is a (binding) decision rule. Despite the negative NPV, the State may want to approve the project, given the increase in social welfare. It is a decision about spending money to provide public oncology services to more patients. Ultimately, it is a political decision.***	To study the possibility of the State using more efficient hospitals, namely private ones, to provide more oncology services, instead of increasing IPOLFG's capacity.
Non-financial benefits (social welfare)	– **Decrease** the number of patients in **waiting lists** and the **average waiting time**. – **Increase IPOLFG's service quality** (e.g.: stop using containers; avoid outpatients moving from one building to the other). – **Increase research activities** (potential new findings about oncology and techniques used). – By assuring higher capacity for IPOLFG, the **State has more control** over the services provided than if leaving it to privates' care, also guaranteeing that all patients are treated.	Estimate by how much waiting lists and average waiting time are going to decrease.
Main risks	– **Demand may not match IPOLFG's increased capacity**, which would imply a larger negative NPV per patient. – **Uncertainty about costs savings**, mainly energy efficiency gains. – **Deviations in the investment amount**: the State will have to support every euro in addition to the €45M predicted (except for the underground floors, whose risk is born by SUCH). – **Financing**: there is uncertainty about JMT and especially about the sponsors financing. If they do not put the expected amount, the State will have to cover the difference.	Based on Energy Performance Certificates (IPOLFG still does not know the one for the new building), estimate more accurately the energy savings. Deeper study about sponsors financing.
Other suggestions	– IPOLFG can try to **improve** its **operational efficiency** by reducing costs. Otherwise, every time IPOLFG increases its scale, *ceteris paribus*, negative results in absolute terms will be even larger. – **The State should revise ACSS reference price** stablished on *contract-programs*, since it seems to be **insufficient for IPOLFG reality**. It should analyze if it is preferable to give more money via revenues or via capital increases.	Benchmarking analysis and operational plan implementation. Revision of State financing: revenues via contract-program vs. equity.

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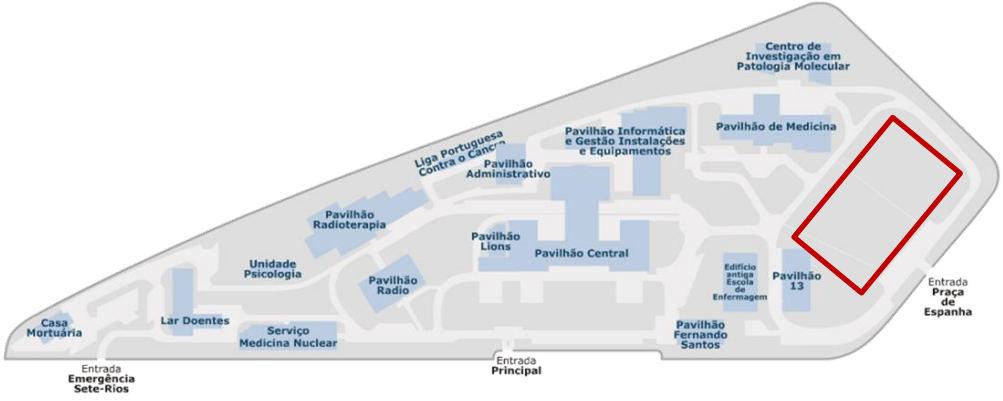
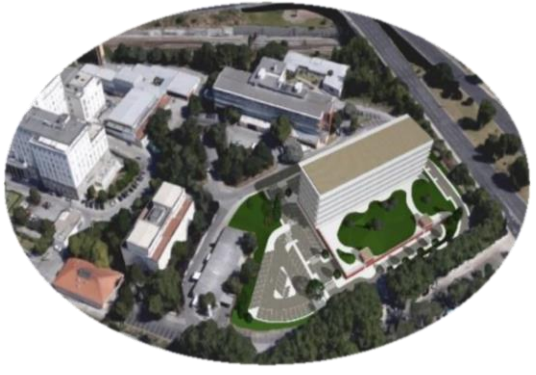
7. Appendices

Attachment 1: Representation of IPOLFG's campus and plan for the new building



Picture A: Representation of IPOLFG's infrastructures, with 15 disperse buildings. The new building is planned to be constructed on the red area.
Source: IPO website.



Picture B: Fictitious representation of IPOLFG's new ambulatory building.
Source: "IPOLFG New Ambulatory Building Functional Program".

7. Appendices

Attachment 2: Estimation of a proxy for IPOLFG's unlevered equity beta

Healthcare selected firms	Levered equity beta[1]	D/E Ratio[1]	Statutory tax rate[1]	Cost of debt[1]	Beta debt	**Unlevered equity beta**	Description
SPI LN Equity	0.48	0.50	19.25%	2.15%	0.35	**0.42**	Spire Healthcare Group PLC (UK) provides a wide variety of private healthcare services in the UK
MCOVB SS Equity	0.76	0.13	22.00%	0.80%	0.10	**0.68**	Medicover AB (Sweden) provides healthcare and diagnostic services worldwide (ambulatory clinics, hospitals, laboratories)
CAPIO SS Equity	0.81	0.67	22.00%	1.76%	0.28	**0.58**	Capio AB (Sweden) provides medical, surgical and psychiatric healthcare services in Sweden, Norway, France, Germany
RHK GR Equity	0.55	0.03	29.79%	0.24%	0.00	**0.53**	Rhoen-Klinikum AG (Germany) operates general, rehabilitation, and emergency healthcare facilities (inpatient and outpatient) in Germany
AVERAGE	0.63	0.33	24.61%	1.24%	0.18	**0.55**	The average unlevered equity beta was the value used for IPOLFG

- Each company's levered equity beta was obtained by regressing the firm's weekly excess returns on the market's weekly excess returns, from 12/10/2013 to 11/10/2018. The STOXX Europe 600 Index was used as proxy for the market, since the selected companies are European. [1]
- Each company's beta debt (necessary to calculate the respective unlevered equity beta) was calculated using CAPM, considering the presented cost of debt, a MRP of 5.5%[2] and a risk-free rate of 0.25% (corresponding to 10-year German Government Bonds[1]).
- Each company's unlevered equity beta was computed using Modigliani-Miller equation, considering the respective values presented for the levered equity beta, the beta debt, the D/E ratio and the statutory tax rate.
- **Unlevered beta sensitivity analysis**: due to the reasons mentioned in the main report, values of unlevered beta smaller than the obtained average should be tested. In this particular case, since FCF is negative, a smaller unlevered beta (resulting in a smaller discount rate) leads to larger negative results (i.e., worse NPV, contrary to what happens for positive NPVs). Thus, the project's NPV would be - €69M for a 0.405 unlevered beta, - €88M for a 0.270 unlevered beta, and - €203M for an extreme bound with an unlevered beta of zero (which is necessarily not true, since, among other reasons, ACSS budget, and consequently IPOLFG's revenues, reacts to market economic fluctuations).

1. Source: Bloomberg. 2. Source: KPMG 2018 Equity Market Risk Premium – Research Summary.

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Documents provided directly by IPOLFG:

- IPOLFG contract-programs with ACSS between 2013 and 2018.
- IPOLFG signed protocol with SUCH.
- “IPOLFG New Ambulatory Building Functional Program”.

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9. Acknowledgments

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